Learning to learn – what is it and can it be measured?

Metacognition and Self-Regulated Learning Colloquium

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Learning to learn: what is it and can it be measured?

1. A short background

2. The concept learning to learn, it’s meaning and it’s different components.
   - Learning to learn – what is it?
     - Learning to learn and learning
     - The paradigms debates
     - What learning to learn is (metacognition, self-regulation)
     - and what it is not (intelligence, problem solving)

3. Measuring learning to learn and the challenges related to it.
   - Learning to learn – can it be measured?
     - (validity, other tests, PISA)
     - Construction of the test
     - Pre-pilot

4. Learning to learn – some reflections.
   - The usefulness of a test.
   - How the concept learning to learn can be used to support learning in different contexts?
A framework for lifelong learning
- eight key competencies

Which skills and knowledge are needed for the knowledge society and for lifelong learning? European Framework for Key Competences (Education Council, 2006)

1. Communication in the mother tongue
2. Communication in foreign languages
3. Mathematical competence and basic competences in science and technology
4. Digital competence
5. **Learning to learn**
6. Social and civic competences
7. Sense of initiative and entrepreneurship
8. Cultural awareness and expression
Indicators and benchmarks: An indicator of learning to learn

- The EU wished to find ways to monitor how the European education systems develop.
- to find ways to monitor how skills and knowledge developed through education
- need to develop new indicators
- learning to learn – an area in which there was a need to develop new indicators
Work on Learning to learn
(2005 – 2008)

- European Network of Policy Makers for the Evaluation of Education Systems set up a task force of experts from interested countries.
- The European Commission set up an Expert Group with representation from interested countries.
- A small working group to develop a test on learning to learn were set up by the Expert Group.
- Network on Learning to Learn - researchers and practitioners with expertise in the field of learning to learn.
What is learning to learn? – a European definition

- The ability to pursue and persist in learning
- To organise one’s own learning, including through effective management of time and information, both individually and in groups.
- Awareness of one's learning process and needs, identifying available opportunities.
- Ability to overcome obstacles in order to learn successfully.
- Gaining, processing and assimilating new knowledge and skills.
- Seeking and making use of guidance.
- Build on prior learning and life experience: at home at work, in education and training.
- Motivation and Confidence.
Learning to learn and learning

<table>
<thead>
<tr>
<th>Learning to learn while learning</th>
<th>Learning competence</th>
<th>Learning in new situations</th>
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Feedback
Defining learning to learn

- Many different definitions – at least 40 (Stringer, 2006)
- developed typically within two separate research paradigms
  - cognitive psychology paradigm: mechanisms used to internalise knowledge
  - the social cultural paradigm: learning embedded within social context
- European definition refers to the ability to access, gain, process and assimilate new knowledge and skills, followed by the ability to reflect critically on the purposes and aims of learning.
- The definition of learning to learn also contains numerous references to how learning to learn is embedded in social relationship and the social context, for example, it references group work, ‘seeking and making use of guidance’ and building on ‘life experiences’
Effective lifelong Learning Inventory (ELLI), University of Bristol

- Effective lifelong Learning Inventory (ELLI) (Deakin Crick, Broadfoot & Claxton, 2004)
- Define and measure a person’s orientation towards effective lifelong learning – learning power
- “a complex mix of dispositions, lived experiences, social relations, values, attitudes and beliefs that coalesce to shape the nature of an individual's engagement with any particular learning opportunity of individual students” (Deakin Crick, Broadfoot & Claxton, 2006)
Learning to learn: “the ability and willingness to adapt to novel tasks, activating one’s commitment to thinking and the perspective of hope by means of maintaining one’s cognitive and affective self-regulation in and of learning action” (Hautamäki et al., 2002, p. 39).

“comprise various domains of skills and abilities. They can be divided into cognitive skills and abilities and affective control skills and abilities” (Hautamäki et al., 2002, p. 41).

Task acceptance (Hautamäki et al., 2002).
British Campaign for learning

- Learning to learn “as a process of discovery about learning. It involves a set of principles and skills which, if understood and used, help learners learn more effectively and so become learners for life. At its heart is the belief that learning is learnable” (The Campaign for Learning, 2007)
British Campaign for learning

“'learning to learn' offers pupils an awareness of:
- how they prefer to learn and their learning strengths,
- how they can motivate themselves and have the self-confidence to succeed,
- things they should consider such as the importance of water, nutrition, sleep and a positive environment for learning,
- some of the specific strategies they can use, for example to improve their memory or make sense of complex information,
- some of the habits they should develop, such as reflecting on their learning so as to improve next time”
- (The Campaign for Learning, 2007).
Learning to learn – self-regulation

- Self-regulating mechanisms:
  - planning what to do next
  - checking outcomes of strategies
  - evaluating and revising strategies

(McCormick, 2006)
Learning to learn - metalearning

- Metacognition - knowledge about cognition (knowing what you do and don’t know) (McCormick, 2006)

- Second-order learning – metalearning: “Learning how to learn is at one stage further removed from any direct specific content of learning. It might therefore reasonably be called ‘second-order learning’. There could be many such comparably second-order activities, such as deliberating how to deliberate, investigating how to investigate, thinking out how to think things out, and so on” (Dearden, 1976. p. 70)
Learning to learn - metalearning

- A type of generic competence working behind other skills and competences
- Central intellectual processing and executive control which control the specialised structural systems (Demetriou, 2006)
**Implications of this formulation:**

- The central processor is, well, central;
- The function of the executive is not yet well formulated;
- The SSSs may develop at different rates for inherent or environmental reasons;
- Development of the SSSs and executive are limited by development of the central processor.

**The Specialised Structural Systems:**

- Imaginal spatial
- Quantitative relational
- Verbal propositional
- Qualitative analytic
- Causal experimental

Learning to learn and intelligence

- A traditional notion of intelligence is that this ability is fixed and non malleable.
- More recent understanding of intelligence constructs intelligence as malleable and describes the processes required to increase intelligence.
- What are missing are those parts of the learning to learn which could be referred to as beliefs, dispositions and attitudes.
Learning to learn and problem solving

- Problem solving tends to be a domain specific competence
- Learning is not itself always about solving a problem.
- The difference between problem solving and learning to learn may be that solving a particular problem requires domain specific knowledge.
Research on learning to learn

- Learning to learn test (University of Helsinki - Hautamäki et al.)
- ELLI - Effective Lifelong Learning Inventory (University of Bristol - Deakin-Crick, Broadfoot & Claxton)
- Test on cross-curricular skills (University of Amsterdam - Meijer, Elshout-Mohr, & Van Hout-Wolters)
- Evaluation of metacognitive skills (University of Madrid – Moreno)
## Framework: Learning to learn

<table>
<thead>
<tr>
<th>Learning to Learn Thinking Skills and Strategies</th>
<th>Learning to Learn Dispositions, Attitudes and Beliefs</th>
<th><strong>Metacognition</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifying a proposition</td>
<td>Learning motivation, learning strategies and orientation towards change</td>
<td>The problem solving (metacognitive) monitoring dimension</td>
</tr>
<tr>
<td>Using rules</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Testing rules and propositions</td>
<td>Academic self-concept and self-esteem</td>
<td>Metacognitive accuracy</td>
</tr>
<tr>
<td>Using mental tools</td>
<td>Learning environment</td>
<td>Metacognitive confidence</td>
</tr>
</tbody>
</table>
Can learning to learn be measured?

- How do we know that a learning to learn test is measuring learning?
- Validity?
- Longitudinal study
- Grades, standardised tests, national tests - What association?
Intelligence and problem solving tests

- If learning competence and intelligence is not the same intelligence tests cannot be used to measure learning to learn.
- If learning competence and problems solving is not the same problem solving tests cannot be suited to measure learning to learn.
- May cover parts of *Learning to learn thinking skills and strategies* scales, but not *Learning to learn beliefs, dispositions and attitudes* scales.
International student assessment

PISA 2000 – focus on reading
PISA 2003 – focus on mathematics and problem solving
PISA 2006 – focus on science
PISA 2009 – focus on reading
PISA 2012 – focus on mathematics

• PISA has emphasized cross-curricular skills to a larger extent than TIMSS and PIRLS.
Comparison PISA frameworks and Learning to learn framework

- "Identifying a proposition" – close to reading literacy, but different purpose and context
- "Using rules" – close to mathematic literacy, but mathematics is used as a mean to provide a task
- "Testing rules/propositions" – close to scientific literacy
- "Using mental tools" – close to problem solving, but problem solving was only a part of PISA 2003

Basic knowledge in mathematics, science and reading comprehension as tested in international tests are obviously closely related to learning to learn, but if tests in those subjects could be used to measure learning to learn this would mean that learning to learn is more or less the same as reading literacy, mathematic literacy, science literacy and problem solving taken together.
PISA framework (2006)

- **Reading literacy**: “An individual’s capacity to understand, use and reflect on written texts, in order to achieve one’s goals, to develop one’s knowledge and potential and to participate in society”
- **Mathematic literacy**: “An individual’s capacity to identify and understand the role that mathematics plays in the world, to make well-founded judgements and to use and engage with mathematics in ways that meet the needs of that individual’s life as a constructive, concerned and reflective citizen”
- **Scientific literacy**: “An individual’s scientific knowledge and use of that knowledge to identify questions, to acquire new knowledge, to explain scientific phenomena, and to draw evidence based conclusions about science-related issues, understanding of the characteristic features of science as a form of human knowledge and enquiry, awareness of how science and technology shape our material, intellectual, and cultural environments, and willingness to engage in science-related issues, and with the ideas of science, as a reflective citizen”
- **Problem solving**: “Problem solving is an individual’s capacity to use cognitive processes to confront and resolve real, cross-disciplinary situations where the solution path is not immediately obvious and where the literacy domains or curricular areas that might be applicable are not within a single domain of mathematics, science or reading”
Looking at PISA test items

- It is not possible to make a judgement based on all PISA items – many items are not available.
- Many PISA tasks could probably be used as part of a learning to learn test,
- but not all PISA tasks would reflect the subscales of the learning to learn framework and not all aspects of learning to learn are covered within the PISA surveys. 
Looking at questions in the PISA student questionnaire

<table>
<thead>
<tr>
<th>Subscales in the framework</th>
<th>PISA 2000</th>
<th>PISA 2003</th>
<th>PISA 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning motivation, learning strategies and orientation towards change</td>
<td>8</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Academic self-concept and self-esteem</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Learning environment</td>
<td>7</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Perceived support from significant other</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Learning relationship</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total number of questions which can be related to learning to learn</td>
<td>20</td>
<td>14*</td>
<td>17*</td>
</tr>
<tr>
<td>Total number of questions in the student questionnaires</td>
<td>41</td>
<td>38</td>
<td>37</td>
</tr>
</tbody>
</table>
Looking at questions in the PISA student questionnaire

- less than half of the questions in the student questionnaires can in some ways be related to learning to learn
- a very generous “classification”
- several of the questions that have been related to learning to learn are specifically related to the learning of the domain in focus of the PISA study
PISA and learning to learn

- many elements of what can be described as learning to learn are covered in the international tests
- based on available PISA items it can be concluded that some of them could be part of a learning to learn test while others could not
- a test with the objective to test learning to learn will give more information about learning to learn than the PISA studies
- to give a definite answer to the question about the overlap between a learning to learn test and PISA it would be necessary to give the two tests to the same sample of students and based on the results analyse the correlations between test results
Proposals made by the small working group

Three parts of the instrument:

- A student test / questionnaire
- A teacher questionnaire
- A head teacher questionnaire
Proposals made by the small working group

The student test / questionnaire contains three parts:

- **Background data**
- **Learning to Learn Thinking Skills and Strategies** (earlier subscales for the cognitive scale) – based on the instruments from Helsinki and Amsterdam
- **Learning to Learn Dispositions, Attitudes and Beliefs** (earlier subscales for the affective scale) – based on the instruments from Helsinki and Bristol
- **Metacognition** - based on the instruments from Madrid
# Student questionnaire / test

<table>
<thead>
<tr>
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<td>Gender</td>
<td>Identifying a proposition</td>
<td>Learning motivation, learning strategies and orientation towards change</td>
<td>The problem solving (metacognitive) monitoring dimension</td>
</tr>
<tr>
<td>Age</td>
<td>Using rules</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parents education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother tongue</td>
<td>Testing rules and propositions</td>
<td>Academic self-concept and self-esteem</td>
<td>Metacognitive accuracy</td>
</tr>
<tr>
<td>School</td>
<td>Using mental tools</td>
<td>Learning environment</td>
<td>Metacognitive confidence</td>
</tr>
<tr>
<td>School class</td>
<td></td>
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</tbody>
</table>


The purpose of measuring learning to learn

- the European interest for measuring learning to learn related to idea of monitoring progress in the European education systems
- a system approach and the intention is to compare countries and education systems
- how well prepared young people are for participation in a society where they are required to continue their learning through their lives
- to help schools to improve their work to support learning
European Pre-pilot

- the Expert Group decided to invite interested countries to participate in a pre-pilot
- Pre-pilot project was organised in spring 2008
- 8 countries: Spain, Austria, Finland, Portugal, Slovenia, Cyprus, Italy & France
- In total 2310 students took part 49 schools
- Students mostly aged 14
- Gender balance, Urban/Rural/Industrial mix, Vocational and Academic
Results from the Pre-pilot

- “The results gave no reason to renounce the framework or its operationalization into the cognitive, affective and metacognitive dimensions.” (Kupiainen, Hautamäki & Rantanen, 2008 p. 97)
- Need to do some changes of the constructs included in the test.
- “Many of the tasks revealed problems in inner consistency or level of difficulty regarding the sampled age cohort” (Kupiainen, Hautamäki & Rantanen, 2008 p. 98).
Results from the Pre-pilot

- “Revising the different tasks to a varying degree, aiming to tasks with a fairly equal number of items to balance the instrument between the five cognitive dimensions it measures” (Kupiainen, Hautamäki & Rantanen, 2008 p. 99).
- “Even if students were not overtly enthusiastic about the tasks, their evaluation of their interest in them fell above the middle point of the scale in all tasks” (Kupiainen, Hautamäki & Rantanen, 2008 p. 95).
Results from the Pre-pilot

“All in all, we hope that the report will help in opening a next stage in the discussion toward a common European indicator for learning to learn, begun already in the 1990s, leading to a wider pilot in near future, with a revised test based on the current instrument” (Kupiainen, Hautamäki & Rantanen, 2008 p. 103).
Learning to learn: some reflections

- Is there a general ability to learn or are there different abilities such as for example the ability to learn languages?
- Difficulties to develop a test.

Test:
- Validity?
- How to make a distinction between knowledge/skills and learning competence?
- Prognostic test
Learning to learn – some reflections

• Maybe it is still of interest to develop a test,
• but perhaps the concept learning to learn is most important as an inspiration for teachers on how to create an learning friendly environment
• and for policy makers to include as a part of the curriculum.
• Usefulness in teaching: When you learn you always learn two things.
• Learning to learn – lifelong learning – learning organizations.
Summary 1

- Learning to learn was considered to be an important area for the development of education systems in Europe.
- There has been a European work on defining the concept learning to learn.
- It was decided that there was a need to develop a European indicator on learning to learn.
Summary II

- A European research network on learning to learn was created.
- An Expert Group has worked with identifying projects on learning to learn, proposing a framework on learning to learn and a European pilot project.
- A draft instrument based on the framework was developed and tested.
What is the difference between learning to learn and learning?

The learning concept has been developed within two different research paradigms; the cognitive psychology paradigm and the social cultural paradigm.

Useful concepts in this context may be self-regulation, metacognition, metalearning, “second-order learning” and to refer to learning competence as a kind of skill or competence behind other skills and competences.
Summary IV

- Learning to learn is not the same as intelligence and cannot be measured through intelligence tests.
- Learning to learn is not the same as problem solving and problem solving tests cannot be used to measure learning to learn.
- International students assessment such as PISA do not measure all aspects of the concept learning to learn.
Summary V

- A Pre-pilot was organized.
- The test that was developed could be further modified and used.
- There are difficulties creating a learning to learn test.
- Perhaps the concept is more useful to inspire teaching and learning.
Further reading

- *The Curriculum Journal*. Special Issue on learning to learn. Fredriksson, U. & Hoskins, B. (Eds.) Volume 18, Number 2, June 2007
  
  [http://publications.jrc.ec.europa.eu/repository/bitstream/11111111/979/1/learning%20to%20learn%20what%20is%20it%20and%20can%20it%20be%20measured%20ofinal.pdf](http://publications.jrc.ec.europa.eu/repository/bitstream/11111111/979/1/learning%20to%20learn%20what%20is%20it%20and%20can%20it%20be%20measured%20ofinal.pdf)
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Thank you!